fact that 100% of the tanneries that had complied with the environmental regulations had violated wastewater and air quality standards. The study finds that the main reasons for these breaches included: low awareness of environmental issues, a lack of technical and financial capacity, weak enforcement, inadequate wastewater treatment systems and the high costs of compliance and relocation. Overall, this means that compliance with regulations does not necessarily ensure an improvement in environmental quality.

The Costs of Compliance vs. the Costs of Non-Compliance

To investigate the factors affecting the compliance of tanneries with wastewater and air quality standards, the study also compares the costs of compliance with environmental regulations to the cost of non-compliance. It assesses the costs that were incurred when tanning companies complied with the environmental regulations on submission of EIA reports, the installation of WWTSs and the payment of wastewater fees.

The study finds that the cost of preparing an EIA report was between VND 150 million and VND 250 million and that the cost of preparing an EM report was about VND 20 million. A simple sediment tank only cost between VND 20 million and VND 30 million, while the cost of a modern wastewater treatment system varied from VND 1,500 million to VND 5,000 million. The average monthly payment for wastewater fees was VND 26.4 million for tanneries located in IPs/IZs and VND 0.3 million for those outside these zones.

Non-compliance with environmental regulations can result in adverse publicity, potentially significant monetary damages and fines and suspension of business operations. The expected cost of non-compliance with the requirements for EIA report submission was found to be between VND 200 million and VND 300 million higher than the cost of submission. This may serve as an incentive for tanneries to comply. The expected cost for not having a WWTS varied from VND 130 million to VND 170 million, while the cost for not paying wastewater fees was zero. The costs of compliance with the regulations on WWTS installation and wastewater charges proved to be higher than the costs of non-compliance. This could encourage non-compliance over compliance.

Policy Recommendations

One problem in Vietnam is that the organizational capacity available to manage the environmental regulatory system is not strong enough to be effective. This is key because, if the probability of detecting polluting firms is low, the level of non-compliance is likely to be very high. The study therefore recommends that environmental departments at all levels should formulate plans to improve their human resources. This should start with the introduction of a staff development program.

In order to increase the compliance of tanneries with environmental regulations, it is recommended that the fines or penalties for non-compliance be five to ten times the total cost of compliance. However, imposing high penalties could result in additional enforcement costs for the managing authorities. Incorporating the cost of enforcement into fines and penalties would be one way to transfer this cost to the violators.

The relocation of factories from highly populated areas is one way to reduce their environmental impact. However, if this is done without any support to encourage them to improve performance it may only result in the relocation of polluters to suburban areas. One possible way to tackle this problem is to have a low interest rate lending scheme (along with consulting services) to help tanneries install and manage waste treatment systems. The Environmental Protection Fund and Recycle Fund could be tapped into to establish such a scheme.

It is also recommended that public awareness be raised to increase informal community pressure on polluting tanneries. This may yield significant levels of compliance in a cost-effective manner.

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The Economy and Environment Program for Southeast Asia (EEPSEA) was established in May 1993 to support training and research in environmental and resource economics across its 9 member countries: Cambodia, China, Indonesia, Laos, Malaysia, Papua New Guinea, the Philippines, Thailand, and Viet Nam. Its goal is to strengthen local capacity for the economic analysis of environmental problems so that researchers can provide sound advice to policymakers.

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Greening the Leather Tanning Industry – A study from Vietnam

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The leather tanning sector in Vietnam is currently growing fast and is becoming an increasingly significant cause of environmental pollution. Now a new EEPSEA study has assessed the environmental impact of the tanning industry in the country, the effectiveness of some of the environmental regulations that govern it and the factors that affect compliance. The study is the work of Le Ha Thanh from the National →

A summary of EEPSEA Research Report No. 2011-RR8: 'Greening the Leather Tanning Industry in Vietnam' by Le Ha Thanh, National Economics University, 207 Giai Phong Road, Hai Ba Trung District, Hanoi, Vietnam.
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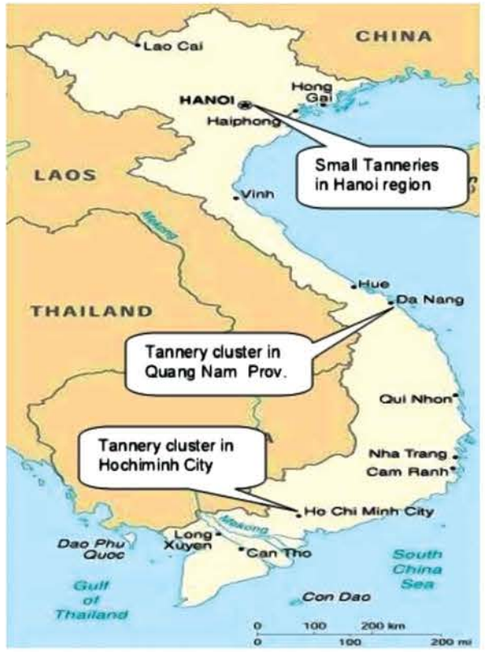
“ regulations are not very effective ... at safeguarding the environment”



Locations of tannery clusters in Vietnam

→ Economics University, Hanoi, Vietnam.

The study finds that the environmental regulations it focused on are not very effective at safeguarding the environment - 100% of the tanneries that complied with the environmental regulations had violated wastewater and air quality standards. It finds that inspections, production capacity, the location of firms, and the type of tannery are significant factors that affect compliance. It concludes that improving the environmental performance of Vietnamese tanneries is crucial and makes a number of specific recommendations on how this can be done. These include strengthening regulatory capacity and increasing fines for non-compliance.

The Leather Pollution Challenge

Currently, leather and footwear products are one of Vietnam's four major export items. In the past ten years, this industry has developed dramatically and in 2010 the export value of leather and footwear products was USD 6.19 billion (accounting for 9.1% of Vietnam's total export value). This success has come at a cost. Leather tanning is a multi-step process that produces a lot of solid and liquid waste, including chromium salts and organic matter such as Biochemical Oxygen Demand (BOD) and Chemical Oxygen Demand (COD), Total Suspended Solids (TSS) and chlorides. Most tanning factories in the country cannot afford to invest in waste treatment facilities and the recent rapid growth of the leather industry has resulted in considerable pollution of rivers, soil and the air. This poses significant risks to the environment and human health.

The environmental impact of leather tanning is especially complicated with respect to small- and medium-sized tanneries. These firms are often located in highly populated areas so their waste discharges have a particularly significant impact on their neighborhoods. What's more, leather production volume in Vietnam is still relatively small-scale and can presently meet only about 30% of the demand from local industry. This indicates that there is likely to be significant growth in domestic leather production and, unless steps are taken to deal with the problem, in its associated pollution.

The Government Response

Recently, the fast growth of the leather industry and the growing public awareness of the risks it poses have led to some government action. The leather tanning industry is now categorized as one of the most polluting industries in the country and a number of urban leather-tanning firms have been scheduled for relocation. Other policies have been introduced by the government of Vietnam to mitigate the environmental pollution of the tanning industry. Indeed, more than 600 regulations directly or indirectly related to environmental protection have been approved in Vietnam in the last ten years. These include requirements to comply with waste material concentration standards, to properly manage all kinds of waste and to provide compensation for the environmental damage caused by business activities.

The EEPSEA study assesses the present environmental impacts of the tanning industry in Vietnam and the effectiveness of the environmental regulations that govern it. The main focus of the study is the environmental regulations that require tanneries to: (i) submit environmental impact assessment (EIA) reports, (ii) install wastewater treatment systems (WWTSs), and (iii) pay wastewater fees. These policies were selected as the key focus for the study because they were thought to be practical and effective in the context of Vietnam.

The research targeted all tanneries in Vietnam. According to the Vietnam Leather and Footwear Association (LEFASO), there are small, scattered tanneries in the northern and central parts of the country (including the Hanoi and Quangnam regions), while the remaining enterprises are gathered in a major cluster in the Ho Chi Minh City (HCMC) region in southern Vietnam. There are about 60 companies and tanning units throughout the country. There are six tanneries with foreign capital while the rest are local private companies and small tanning units.

How Data was Collected

The primary data for the research came from two sources: A field survey of 54 tanneries in the provinces of Hanoi, Ho Chi Minh City and Quangnam (which represented about 90% of the tanning establishments in Vietnam) and face-to-face in-depth interviews with relevant employees and stakeholders. Secondary sources of data on the leather and tanning industry in Vietnam included officially and unofficially published information, technical and scientific journals and other domestic and international publications.

The field survey used a questionnaire to gather information. The first part of this questionnaire sought information on each tannery's profile. The second part of the survey collected information about the environmental performance of the tanneries in terms of their waste production and waste treatment facilities. The third part of the questionnaire consisted of questions on the perceptions and attitudes of the managers and staff at the tanneries and their motivations for bringing about environmental improvement. Finally, the survey questionnaire asked respondents for suggestions on how to improve the environmental performance of their tanneries.

The Impact of Regulations

In general, the three regulations assessed in the study can be said to have been quite successful in influencing the environmental behavior of large- and medium-sized tanning facilities. This is reflected in the relatively high percentage of medium-sized and large tanneries that complied with their requirements. Indeed, the compliance rate of tanneries in general was found to be much higher than that of other industrial sectors in Vietnam, such as the paper-making and food-processing industries.

The only part of the tannery sector that has not responded positively to environmental regulations is made up of small household tanneries. None of these were found to have complied with environmental regulations. The main reasons for this non-compliance were a lack of technical and financial capacity. This was compounded by a low level of awareness among the small tanneries. In general small tanneries cannot afford the costs of compliance and this has resulted in a range of negative impacts on the environment and human health.

Other Factors affecting Environmental Performance

In general, national regulations are one of the most influential factors affecting the environmental attitude of firms in the tanning industry. However, the effects of governmental regulations depend largely on the enforcement and inspection capacity of the relevant authorities.

Tanneries with a higher production capacity were more likely to display better environmental performance than those with smaller capacities. Southern tanneries seemed to comply with environmental regulations to a greater extent than those in the central and northern regions. In addition, the tanneries located inside IPs/IZs demonstrated better environmental performance compared than those located outside these zones.

One of the study's most striking findings is that the environmental regulations that were assessed provide inadequate protection for the environment. This was shown by the

Regulation	Northern Region	Central Region	Southern Region	Inside IPs/IZs	Outside IPs/IZs
EIA submission	2	1	30	25	8
Payment of wastewater fees	2	1	30	25	8
Installation of WWTS	4	1	30	25	10

Compliance of tanneries with environmental regulations by location